Atlantic Richfield Company

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December 5, 2012

Mr. Steven Way
On-Scene Coordinator
Emergency Response Program (8EPR-SA)
US EPA Region 8
1595 Wynkoop Street
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Delivered via e-mail

Subject: November 2012 Monthly Progress Report
Rico-Argentine Mine Site – Rico Tunnels
Operable Unit OU01, Rico, Colorado

Dear Mr. Way,

This progress report describes activities conducted during the month of November, 2012 at the Rico-Argentine Mine Site and activities anticipated to occur during the upcoming month. These activities are organized by task as identified in the Removal Action Work Plan. This progress report is being submitted in accordance with Paragraph 35.a of the Unilateral Administrative Order for Removal Action (the "UAO"), dated March, 2011.

ACTIVITIES FOR NOVEMBER

This section describes significant developments during the preceding period including actions performed and any problems encountered during this reporting period.

Site-Wide Activities

- Digital archives continue to be reviewed by the Atlantic Richfield project team for information that may provide a better understanding of the Rico site.
- Provided security at the Blaine Tunnel, 517 Shaft, and St. Louis Ponds area.
- Secured equipment yard at north end of site as well as various locations throughout site.
- Completed demobilization of equipment from the 2012 work onsite.
- Russ Nelson, EPA contractor onsite to provide underground work assistance and observe site work activities on 11-1-12, 11-7-12, 11-8-12, 11-14-12 and 11-15-12.
- Jan Christner, EPA contractor onsite to observe work activities on 11-1-12.

Task A – Pre-Design and Ongoing Site Monitoring

- Field data was collected at the two flumes during the November surface water sampling event.
- Surface water flow measurements were collected per protocols contained in the Sampling and Analysis Plan for Surface Water Sampling (SAP).
- Surface water samples were collected at locations and per protocols identified in the SAP.
- Surface water samples were submitted for laboratory analysis per protocols identified in the SAP.
- Four composite surface water samples were collected at Dolores River cross sections DR-1, DR-2, DR-7, and DR-4-SW per protocols identified in the SAP and in the AECOM Technical SOP for collection of cross-channel surface water samples.
- Composite samples were submitted for laboratory analysis per protocols identified in the SAP.

- Discrete transect sampling was collected from DR-7 and submitted for laboratory analysis per protocols identified in the SAP.
- Nine new wells were completed, the bore holes logged, the casing and surface well heads placed per the approved work plan. The wells were developed during November.
- Ground water samples were collected at the 12 wells completed in 2011, the 9 newly installed wells completed in 2012 and the eight (8) pre-existing wells located onsite.
- Ground water samples were submitted for laboratory analysis per protocols identified in the SAP.
- St Louis tunnel water was sampled from AT-2 and submitted for laboratory analysis per protocols identified in the SAP.
- Flumes were inspected for debris buildup and cleared as needed.
- Downloaded available data through end of October 2012 from the Parshall flume data loggers. The data will be posted to the project data SharePoint site by early December.
- Downloaded available data through mid-November 2012 from the pressure transducer located in angle borehole AT-2. The data will be posted to the project SharePoint site by early December.
- Digital output files (electronic data deliverables) for surface water sampling analytical laboratory results from September 2012 have received QA/QC review and will be posted by early December to the project data Share-Point site.
- Field and analytical sampling data for the September 2012 surface and groundwater sampling events have received QA/QC review and will be posted by early December to the project data SharePoint site.
- Surface water grab samples were collected from the west bank of the Dolores Rives near the exploratory borehole releasing geothermal water, The samples collected are EH-5, EH-5P, EH-5A, EH-5B, EH-5C, EH-5DP, EH-5EP, and EH-5EP Flow. Field data was collected and all samples were submitted for laboratory analysis per protocols identified in the SAP.
- Sixteen of the newly installed wells and bore holes were surveyed for position and elevation. The remaining wells will be surveyed in December.
- Continued work on overall site Data Management System (EQuIS) development.
- Conducted inspection of the pond system embankments, water levels and general conditions.

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- St Louis adit discharge water was diverted to Pond 18; however, due to seeps and leakage from a partially buried historic plastic pipe between Pond 18 and 15, water was routed back into Pond 15 for the winter. Pond 18 will be closely monitored for seepage conditions as accessible over the winter and next spring.
- Lidar scan surveys of Pond 13 were completed. Total estimate of wet solids removed from Pond 15 by survey is approximately 2,035 CY. The Pond 15 field-based removal estimate is 2,200 cy. From field soundings completed the average depth of the remaining wet solids in Pond 15 is estimated at 1.95 feet.
- The dredging equipment and back-up pumps were demobilized from the site.
- Collected material samples and completed solids surface survey of Ponds 16/17 interim drying facility.
- Results for the SPLP analyses for the calcines samples were received during the last week of November and will be summarized in a report during December. Mineralogical evaluation of the calcine samples using visual and XRD methods is ongoing and will be completed by mid-December.
- Completed installation of drain culvert from Pond 13 to Pond 10.
- Completed construction of a spillway above the Pond 18 flow control gate.

Task C – Design and Construction of a Solids Repository

- Continued work on geotechnical analyses of an alternative drying facility and repository sites, focusing current attention on Pond 13 as an interim and potentially final drying and/or solids repository site.
- De-mobilized drilling equipment from the St. Louis Ponds site.

- Seven boreholes drilled this month. A total of 20 wells and boreholes completed this year.
- Total borehole footage this month: approximately 740 ft; total this year: 1948 ft.
- The following drilling has been completed related to the Solids Repository Design during the month of November:
  - South Stacked Repository: MW-104, SSR-102, SSR-104

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- The following wells and boreholes have been completed during the month of November:
  - Collapsed Adit Area: CHV-101, MW-202, MW-204.
- Evaluation continued of tunneling and open-cut alternatives to access the Hermosa Formation in the St. Louis Tunnel as the target location of installation of hydraulic controls.

Task E – Source Water Investigations and Controls

- Continued the 517 Shaft injection test.
  - Continued the injection of 23.5% solution of potassium carbonate at approximately 0.6 gallons per minute (gpm).
  - Continued the addition of carrier water from Silver Creek at approximately 25 gpm.
  - Started the addition of 25% sodium hydroxide on November 1, 2012. The 25% sodium hydroxide solution was injected in-line with the carrier water from Silver Creek from approximately 100 milliliters per minute (mL/min) to 220 mL/min.
  - Completed the 517 Shaft injection test on November 7, 2012.
  - Continued sampling at the St Louis Tunnel discharge (DR-3A) until November 14, 2012.
  - Removed the pH and conductivity probes deployed in the 517 Shaft and collected post-injection mine water samples on November 14, 2012.
  - Completed all demobilization activities and secured equipment and materials for future reuse in the former Lime Treatment Building.
  - The 517 Shaft Access and Blaine Tunnels were winterized on November 15, 2012.
  - Russ Nelson (URS, on behalf of U.S. EPA) assisted with 517 Shaft and Blaine Tunnel access weekly throughout the duration of the 517 Shaft injection test.
- Removed the two transducers from Silver Creek that were transitioned from the EPA. The transducers were located upstream and downstream of the mine workings and will be re-installed in the spring.

Task F – Water Treatment System Analysis and Design

- Continued implementation of the constructed wetland pilot scale test.
  - Introduced water into the wetland on November 3, 2012; however, effluent flow did not occur as expected. The loss of water appeared to be due to vertical infiltration near the interface of the bottom liner and the sides of the sheet pile.
  - Removed and stockpiled the wetland matrix while a new PVC liner was installed. Re-installed the wetland matrix and re-introduced flow into the wetland. These construction activities were completed by November 9, 2012.
  - Repaired leaks in the HDPE liner of the rock drain.
  - Installed temporary power line and meter facilities to wetland pilot test.
  - Completed electrical startup and commissioning activities.
  - Conducted weekly water quality measurements to assess colonization of the wetland.
  - Continued limited bench-scale testing to further evaluate additional passive treatment alternatives.
- Ion exchange bench testing included:
  - Performed batch contacts using first three resins selected (Lewatit TP-207, Purolite S950, and Dow XUS 43604). A fourth resin, Purolite SS957, results will be available by December 3. Results of IX batch tests will be summarized in December.
  - Kinetic and final aqueous samples collected for analysis.

- Continued scoping of work to address data needs for water treatment system alternatives evaluation.
- Electrical installation at the former Lime Plant Building initiated.
- The following drilling has been completed related to the Pond Embankments during the month of November:
  - Dikes and Embankments: ED-107.

ACTIVITIES FOR UPCOMING MONTH

This section describes developments expected to occur during the upcoming reporting period, including a schedule of work to be performed, anticipated problems and planned resolution of past or anticipated problems.

Site-Wide Activities

- Review and post September Surface Water Sampling Report and cross sectional transect data to the project SharePoint site in December. (https://extranet.aecom.com/sites/ricostlouis/SitePages/Home.aspx)
- Continue development of a geologic/geotechnical model of the site utilizing RockWorks data visualization software.
- Continue reviewing the digitally archived historic documents and maps.
- Begin implementation of winter support and monitoring schedule.

Task A – Pre-Design and Ongoing Site Monitoring

- Conduct surface water and groundwater sampling/analyses and flow measurements per protocols contained in the SAP.
- Post surface water quality data to the SharePoint site after QA/QC review.
- Download data from the Parshall flume data collectors and post to the project SharePoint site.
- Continue work on overall site Data Management System development.
- Complete monthly inspection of St. Louis Pond system. Provide detailed inspection of Pond 18 embankments.

Task B – Management of Precipitation Solids in the Upper Settling Ponds

- Continue evaluation of calcine tailings/Pond 18 solids SPLP and associated geochemical testing and prepare a technical memorandum to document the results of the testing.
- Continue to monitor and collect material samples and complete solids surface survey of Ponds 16/17 interim drying facility as weather conditions allow.

Task C – Design and Construction of a Solids Repository

- Continue evaluation of alternative locations, including Pond 13, as possible alternative treatment solids repository and/or drying facility sites.
- Continue geotechnical analyses to support design of a permanent drying facility and repository, including ongoing laboratory testing to address data gaps under the Supplement to FSP.
- Continue efforts to secure access to lands needed for a permanent drying facility and solids repository.

Task D – Hydraulic Control Measures for the Collapsed Area of St. Louis Tunnel Adit

- Monitor/download data from the transducer at drill hole AT-2.
- Continue evaluation of tunneling and open-cut alternatives to access the Hermosa Formation in the St. Louis Tunnel as the target location of installation of hydraulic controls.

Task E – Source Water Investigations and Controls

- Begin preparation of a Treatability Study report to document implementation of the 517 Shaft injection test and interpretation of results.
- Continue development of a plan to implement the source control data collection and analysis that incorporates temporary management and treatment technology testing of mine waters intercepted in the Blaine workings as part of the source control Technical Memoranda required under this Task E.
- Continue work on compilation of relevant historic mine workings and information from ongoing EPA studies into AutoCAD 3D model of the mine workings reporting to the St. Louis Tunnel.

Task F – Water Treatment System Analysis and Design

- Begin constructed wetland pilot scale testing.
  - Collect baseline water samples and matrix samples in accordance with the Sampling and Analysis Plan (SAP).
  - Conduct water quality monitoring and sampling in accordance with the SAP.
  - Perform a tracer study to determine residence times of the rock drain and constructed wetland.
- Begin preparation of a technical memorandum to document construction and pre-implementation activities of the constructed wetland pilot scale test.
- Continue limited bench-scale testing to further evaluate additional passive treatment alternatives.
- Continue ion exchange bench scale testing and initiate work on a technical memorandum to document the results of the testing.
- Continue geotechnical analyses of flood dike and pond embankment seepage/piping and stability under static and seismic loading in support of final evaluation of long-term improvements.
- Continue scoping of additional data needs as necessary related to treatment system alternatives.

If you have any questions, please feel free to contact me at (951) 265-4277.

Sincerely,

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